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DATE: November 13, 2012

SUBJECT: AGRICULTURAL AND NON-AGRICULTURAL SCHOOL-RELATED PESTICIDE ILLNESS CASES REPORTED TO THE PESTICIDE ILLNESS SURVEILLANCE PROGRAM AND EVALUATED AS ASSOCIATED TO PESTICIDE EXPOSURE, 2005-2009

A query was generated from the California Pesticide Illness Surveillance Program (PISP) Oracle database using Standard Query Language. It extracted case episodes received by PISP from 2005-2009 in which health effects were evaluated as definitely, probably, or possibly related to exposure to pesticide where the incident setting was a school or the case narrative includes the term "school" or "student", and where the occupational code does not refer to a college or university.

Background

PISP receives reports of pesticide illness from Doctor's First Report of Occupational Illness and Injury, documents associated with California workers' compensation claims, as well as illness reported by California Poison Control System (CPCS). Some cases are also reported directly from medical professionals. Under California law, physicians are required to report any suspected case of pesticide-related illness or injury by telephone to the local health officer within 24 hours of examining the patient.

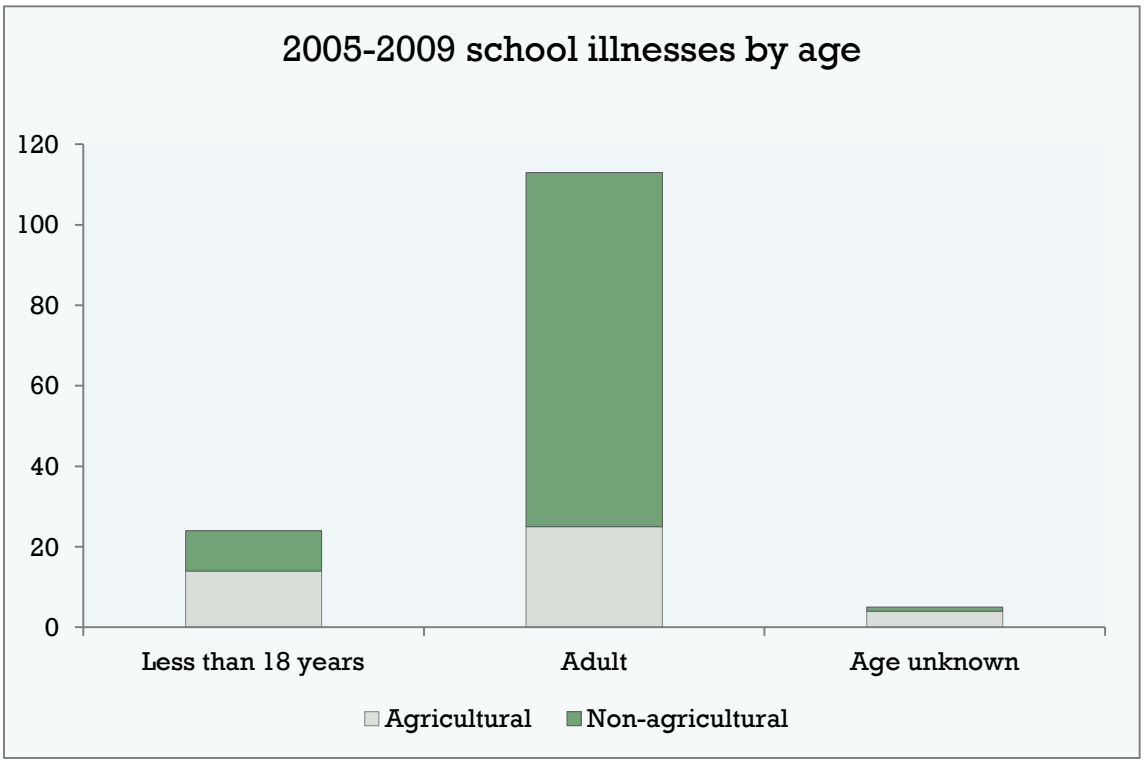
PISP scientists evaluate these initial reports and assign cases that meet program criteria for investigation to the County Agricultural Commissioner (CAC). CACs investigate identified pesticide illnesses that occur in their jurisdictions. They attempt to locate and interview all people with knowledge of the exposure events, collect samples when useful, and review relevant records. When investigations are complete, CACs send reports to PISP describing their findings. PISP scientists evaluate medical reports and all information the CACs gather in the investigative process. They abstract and encode basic descriptors of the event, then undertake a complex synthesis of all available evidence to assess the likelihood that pesticide exposure caused the illness. Standards for the determination are described in the PISP program brochure, "Preventing Pesticide Illness," which can be viewed or downloaded from DPR's web site at http://www.cdpr.ca.gov/docs/whs/pisp/brochure.pdf.

An **associated case** is a record of one pesticide exposure and its apparent effects evaluated as definitely, probably, or possibly related to that exposure. A definite relationship indicates that both physical and medical evidence document exposure and consequent health effects. A probable relationship indicates that limited or circumstantial evidence supports a relationship to pesticide exposure. A possible relationship indicates that health effects correspond generally to the reported exposure, but evidence is not available to support a relationship. Cases classified as unlikely, indirect, asymptomatic, or unrelated were not included in the query. A **case episode** is an incident in which one or more people experience pesticide exposure from a particular source. A **priority** number is a code assigned to each case in an episode that meets priority criteria, which include: a. More than 5 persons were exposed; b. a person was admitted to a hospital, or; c. death occurred.

Summary

Twenty cases were excluded from the body of query results. Of the 20, 18 cases involved five school bus drift episodes that did not involve school grounds. The additional two cases were captured by the query language but were found to be unrelated. One illness occurred at a swim school and the other involved an adult student intern performing field work. These cases are listed on separate tabs in the Excel worksheet.

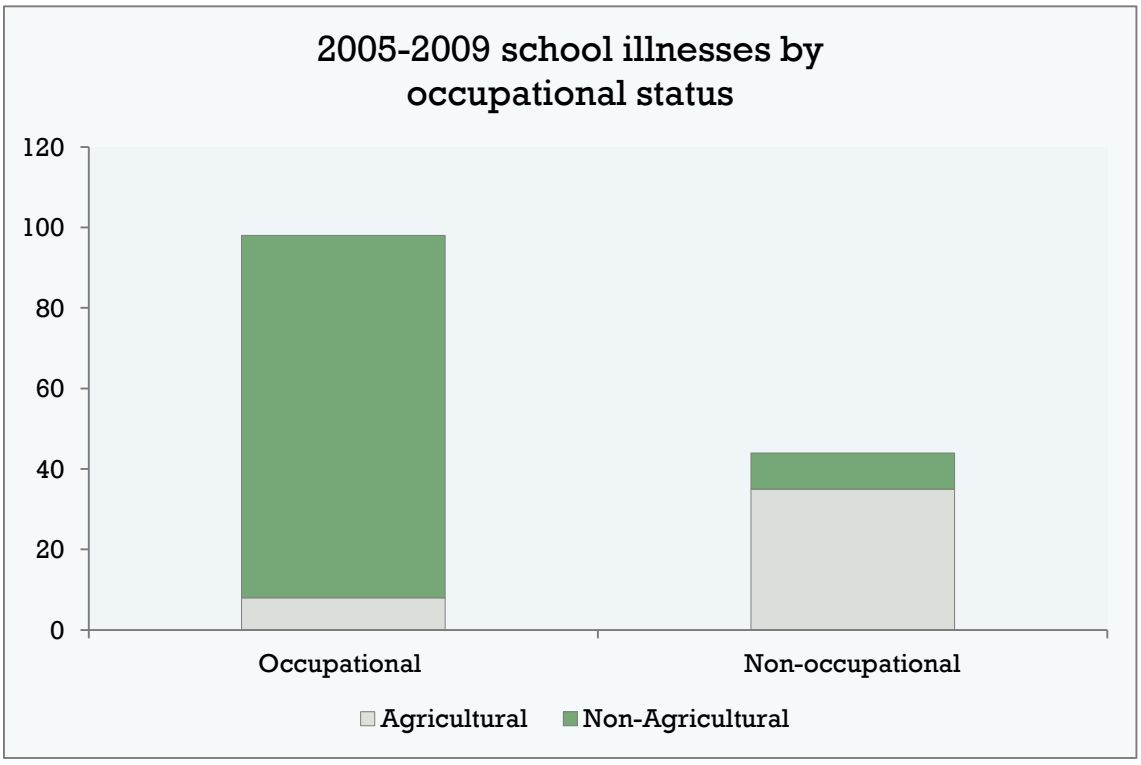
The query yielded 142 cases of associated illness, 43 (30%) classified as agricultural and 99 (70%) as non- agricultural. A designation as '**agricultural**' indicates exposure to pesticide intended to contribute to production of an agricultural commodity. Any other exposure situation is designated '**non-agricultural**'.



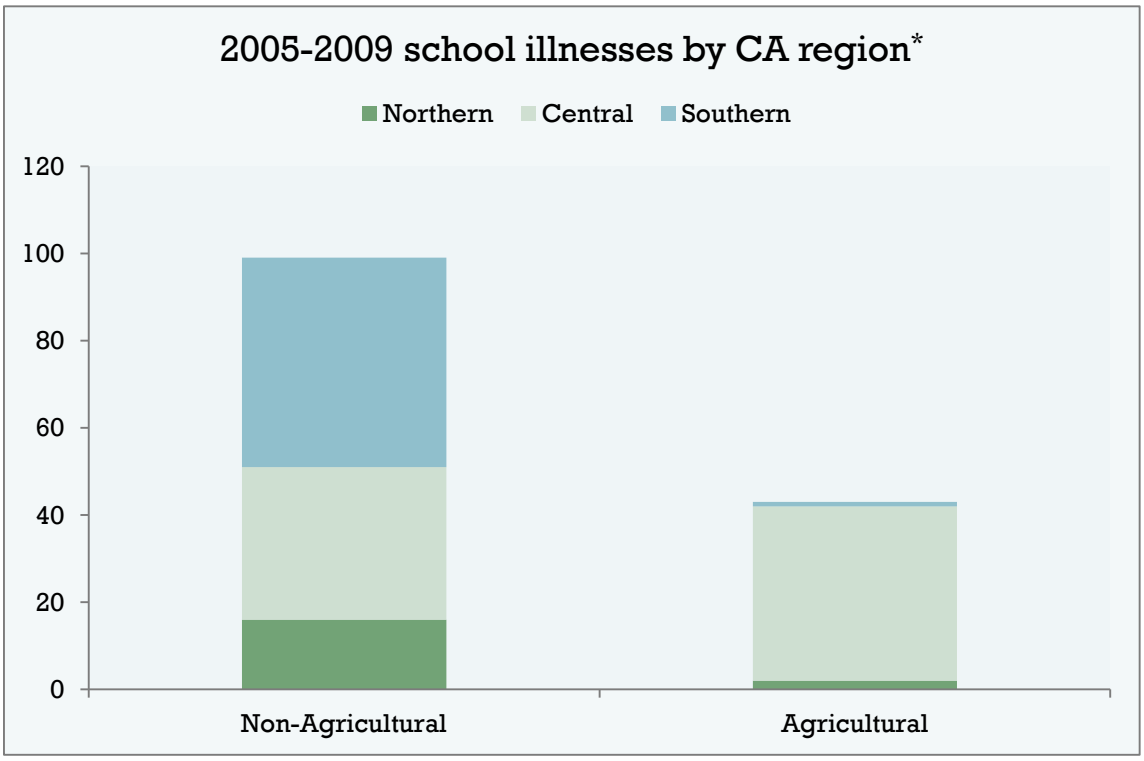
The majority of illnesses occurred among adults (80%) rather than children (17%). Pesticide illnesses involving persons known to be less than 18 years of age constituted 24 of the 142 cases. Children experienced pesticide illnesses from agricultural sources in 14 cases versus 10 non-agricultural cases. Age was unknown in 5 cases.

Of the 14 agricultural cases affecting youth, 13 were attributed to two separate priority episodes. Nine cases stemmed from a 2007 priority episode attributed to a fumigant application in Monterey County. In a 2009 priority, four children experienced symptoms after an agricultural application of fungicide drifted onto school grounds in Tulare County.

The 10 non-agricultural cases involving children included six members of a high school water polo team in Orange County who were exposed to a chlorine release in the school swimming pool in 2008. Of the remaining four incidents, two involved antimicrobials, and one each implicated an herbicide and an insecticide.



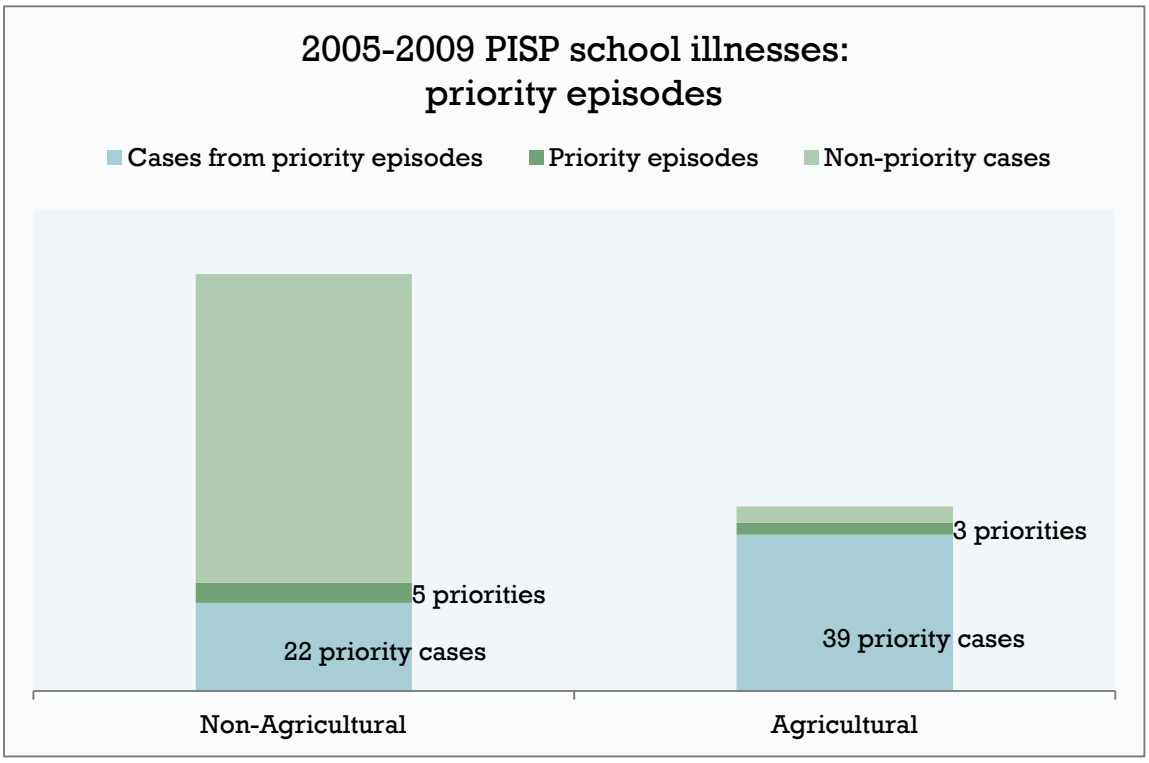
Occupational illnesses, defined as those that occurred while the affected person was at work, comprised 98 (69%) of the 142 cases. Of occupational cases, 90 (92%) were defined as non-agricultural. Antimicrobial pesticides were implicated in 64 (71%) of the 90 non-agricultural occupational cases.



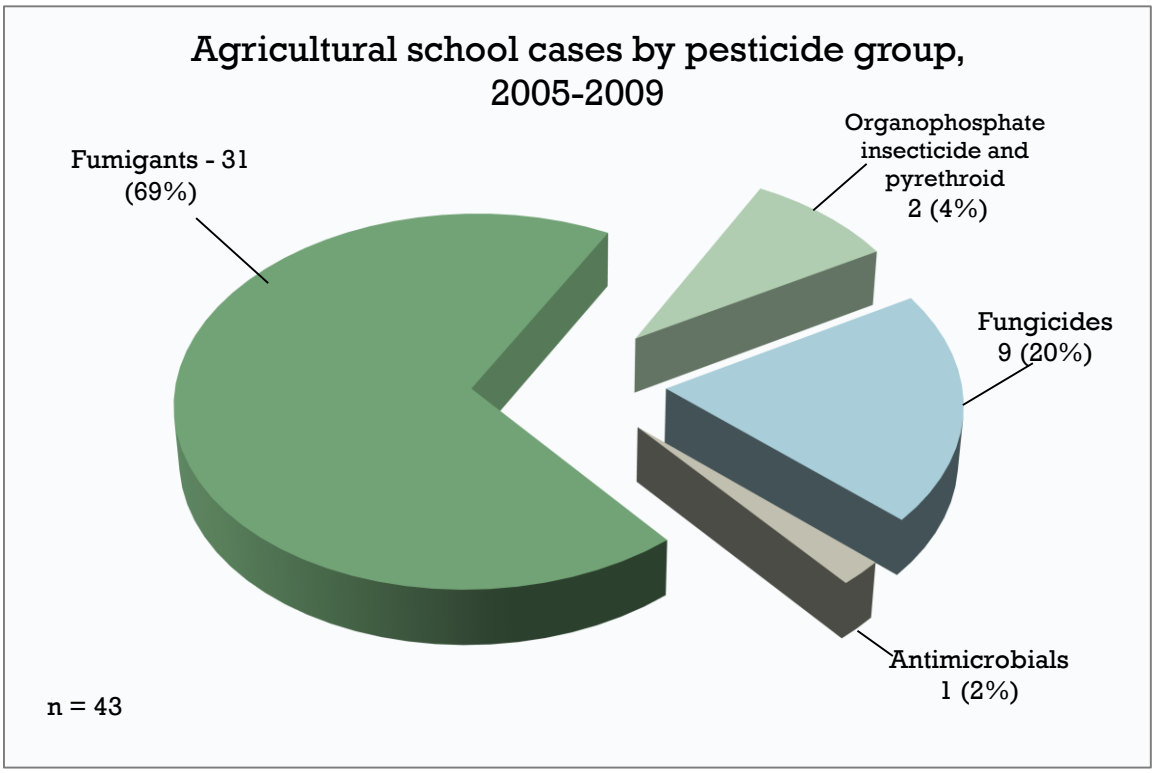
* DPR Regional Offices. Details at http://www.cdpr.ca.gov/docs/enforce/romap.pdf

Of the 43 Agricultural cases generated by the query, 40 occurred in the central region. Almost all of the central region agricultural cases (39, 98%) were from 3 priority episodes involving suspected pesticide drift in Monterey and Tulare Counties.

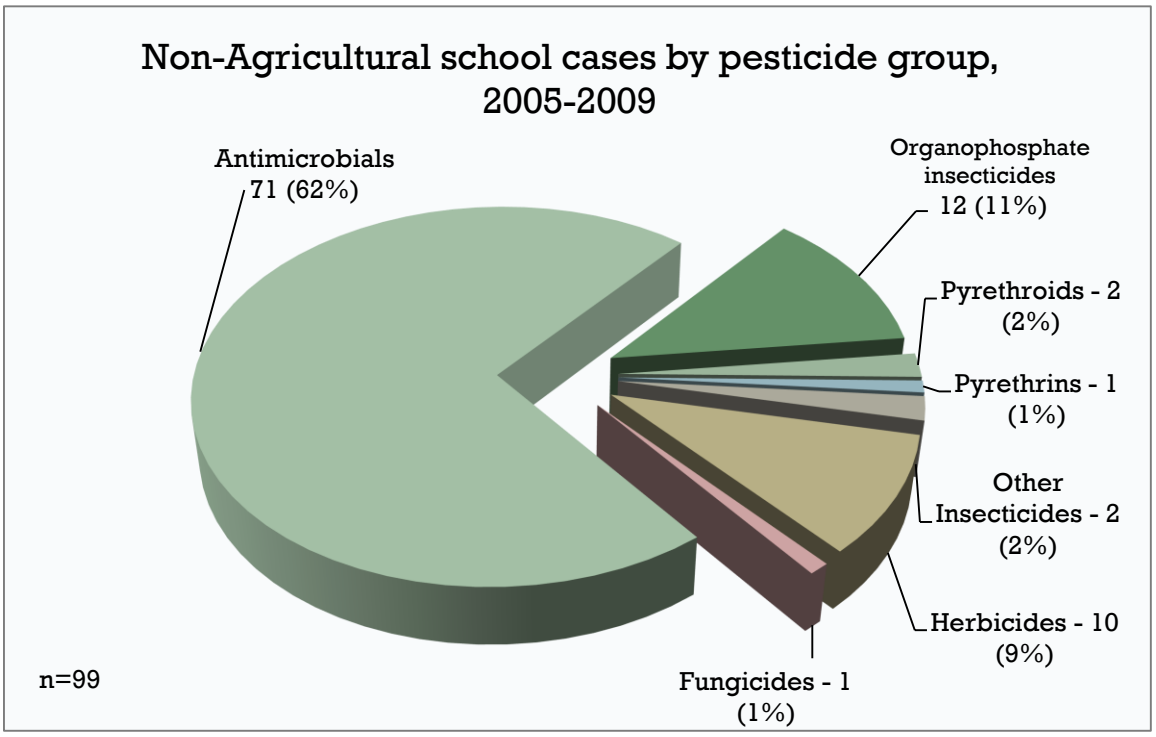
Non-agricultural cases included 48 from the Southern Region, 35 from the Central Region and 16 from the Northern Region.



Agricultural cases, though responsible for only 30% of the 142 cases, tended to expose more people per incident than non-agricultural exposures. The largest of the agricultural priority incidents involved a 2007 fumigant application in Monterey County which included 31 illnesses, including complaints of illness at a school. Of 99 non-agricultural cases, 77 (78%) of non-agricultural cases were single cases of illness not involving hospitalization.



Agricultural cases were dominated by fumigant exposures, but it is important to note that all 31 instances of fumigant illnesses stemmed from one priority episode in Monterey which included complaints of illness at a school. Nine cases involved fungicides, eight of which resulted from a single priority exposure in Tulare County in 2009. The two cases of organophosphate illness and the two instances of pyrethroid involvement stem from one episode which involved two brothers who encountered a tree farm being sprayed with acephate and esfenvalerate as they walked to school. The school nurse smelled pesticide on them and sent them home. The tree farm provided compensation for the clothing their mother threw away and the boys recovered without incident.



Among non-agricultural school cases, antimicrobials were implicated in the majority of illnesses. Of the 71 antimicrobial cases, 64 were occupational injuries. Six of the remaining seven involved a release of chlorine into a school pool, exposing members of a high school water polo team.

The 12 organophosphate cases all stemmed from residential misuse of malathion. Seven of the 12 were part of a priority episode in 2009, in which a San Bernardino homeowner applied concentrated malathion on her lawn in conflict with the label. Teachers and aides at a nearby school fell ill. It appears that some students may also have been affected according to teacher statements, but case numbers were not assigned due to insufficient information.

Comments

The query extracted 162 associated cases of cases received by PISP from 2005-2009 in which health effects were evaluated as definitely, probably, or possibly related to exposure to pesticide where the incident setting was a school or the case narrative includes the term “school” or “student”, and the occupational code does not refer to a college or university. Twenty cases were removed from analysis because they were found to be unrelated to the request.

Of the illnesses reported and found to be associated, adults injured in the course of employment constituted the majority of cases, comprising 98 (69%) of the 142 cases.

The most commonly implicated pesticide group was antimicrobials, which were found to be a factor in 72 (50%) of illnesses. Antimicrobials were followed by fumigants, which were responsible for 31 illnesses, but it is important to note that all 31 were from a single agricultural drift episode.

Agricultural drift priority episodes, when they occur, have the propensity to expose multiple persons per exposure. Though there were fewer overall agricultural cases than non-agricultural cases, 91% of agricultural cases stemmed from three episodes of suspected drift from agricultural applications.

Of non-agricultural cases, 90 (92%) were occupational. Antimicrobial pesticides were implicated in 64 (71%) of the 90 non-agricultural occupational cases.

The majority of illnesses occurred among adults (80%) rather than children (17%). Pesticide illnesses involving persons known to be less than 18 years of age constituted 24 of the 142 cases. Children experienced pesticide illnesses from agricultural sources in 14 cases versus 10 non-agricultural cases. Age was unknown in 5 cases.

Questions or comments may be directed to PISP scientist April Holland, MPH. Please send email to aholland@cdpr.ca.gov, or call 916-445-3488.